

REMARKS/ARGUMENTS

The Applicant has carefully considered this application in connection with the Examiner's Action mailed August 6, 2004, and respectfully requests reconsideration of this application in view of the foregoing amendments and the following remarks. The Applicant originally submitted Claims 1-23 in the application. In an amendment mailed July 20, 2004, the Applicant amended Claims 1, 9 and 17, and cancelled Claims 5, 13 and 21. In this response, the Applicant has amended Claims 1, 9 and 17, and added new Claims 24-26. The new claims correspond to previously cancelled claims 5, 13 and 21. In addition, the new claims and the amended claim language in Claims 1, 9 and 17 further clarify the presently claimed invention. Accordingly, Claims 1-4, 6-12, 14-20 and 22-26 are currently pending in the application.

The Applicant previously submitted a response to the Examiner's August 6, 2004 Final Office action, pursuant to 37 C.F.R. §1.116, which was not entered. The Applicant requests that the Examiner disregard that submission and instead consider the amendments and arguments herein.

I. Formal Matters and Objections

The Examiner has objected to the abstract of the disclosure because the current abstract does not reflect the inventive feature of the claimed invention to distinguish it over the prior art. In response, the Applicant offers an amended abstract that more fully reflects the inventive feature of the claimed invention to distinguish it over the prior art, and appreciates the Examiner bringing this to his attention. Accordingly, the Applicant respectfully requests that the Examiner withdraw his objection to the abstract.

The Applicant also offers amended paragraphs [0011], [0019] and [0038] of the specification to correct various typographical errors.

II. Rejection of Claims 1-4, 6-12, 14-20, 22, and 23 under 35 U.S.C. §112, ¶2

The Examiner has rejected Claims 1-4, 6-12, 14-20, 22, and 23 under 35 U.S.C. §112, ¶2, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention. Specifically, for example, the Examiner asserts that in Claim 1, it is not clear how the slots in the PC queue are used and what the utility is of having more slots. In response, the Applicant has amended independent Claims 1, 9 and 17 to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention. The Applicant also submits an amendment to paragraph [0019] of the specification to remove any ambiguity that might have existed in the terms used to describe the embodiments of the invention. Support for the amended and added claims can be found in paragraph [0019], FIG. 4 and the corresponding discussion in the text.

The Applicant respectfully submits that the Specification as amended meets the requirements of 35 U.S.C. §112, ¶2 to particularly point out and distinctly claim the subject matter of the invention. One of the inventive aspects of the interaction between the PC queue and the staging registers as described is implicit in the ability of the processor to employ speculative execution with out-of-order processing. The Specification, Table 1 describes a grouping (GR) stage of the pipeline. A grouping stage is employed in a processor using out-of-order execution of instructions to maximize utilization of processor resources. In such a processor, it is not sufficient to use a FIFO register to synchronize mispredict PC values to the instruction execution pipeline. When instructions may be executed out-of-order, greater efficiency is obtained when a second mispredict PC value, corresponding to a second speculative branch in a first

execution branch that has not been resolved, is stored until the first branch is resolved, and then if needed, inserted into a staging register queue.

This functionality is provided in the instant application by the interaction of the mispredict PC FIFO queue 234, which is readable at each FIFO stage, multiplexor 420, which provides a means to select from each FIFO 234 stage, and staging registers 340. Continuing the example above, as a first misdirect PC value progresses through staging registers 340, the second mispredict PC value, which may not be needed, progresses through the mispredict PC FIFO queue 234. If the path corresponding to the first mispredict PC value is resolved to determine that the second mispredict PC value is valid, then the second value is selected by the multiplexor 420 to enter the staging registers 340. If the depth of the mispredict PC FIFO queue 234 is less than the number of staging registers, then under certain conditions, the second mispredict PC value may be lost before the path corresponding to the first mispredict PC value is resolved. By setting the number of FIFO 234 slots to be equal to or greater than the number of staging registers, the possibility of overflow is substantially reduced.

In light of these amendments and arguments, the Applicant sees the Specification to meet the requirements of 35 U.S.C. § 112, ¶2, and respectfully requests that the Examiner withdraw his rejection under this paragraph.

III. Rejection of Claims 1-4, 6-12, 14-20 and 23 under 35 U.S.C. §102(e)

The Examiner rejected Claims 1-4, 6-12, 14-20 and 23 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,578,134 to Van Dyke, *et al.* The Applicant respectfully disagrees.

As illustrated in Figure 3, Van Dyke discloses branch processing with an alternate PC 34 and a

target PC. The branch processing, however, does not include a mispredict PC queue that has as many slots as a number of staging registers as recited in independent Claims 1, 9 and 17. Thus, Van Dyke does not teach each element of independent Claims 1, 9 and 17 and claims dependent thereon. Van Dyke, therefore, does not anticipate Claims 1-4, 6-12, 14-20 and 23. Accordingly, the Applicant respectfully requests that the Examiner withdraw the §102(e) rejection of Claims 1-4, 6-12, 14-20 and 23 and allow issuance thereof.

IV. Rejection of Claims 1-4, 6-12, 14-20 and 23 U.S.C. §102(b)

The Examiner has rejected Claims 1-4, 6-12, 14-20 and 23 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,933,850 to Kumar, *et al.* The Applicants respectfully disagree.

Kumar does not teach mispredict PC storage including a mispredict PC queue and a number of staging registers with the mispredict PC queue having at least as many slots as the number of staging registers as recited in Claims 1, 9 and 17. In fact, the Applicant does not even find any teaching in Kumar of a queue for mispredict PC values. Accordingly, Kumar does not teach each element of independent Claims 1, 9 and 17, and as such, is not an anticipating reference for Claims 1, 9 and 17 and Claims dependent thereon. Therefore, the Applicant requests that the Examiner withdraw the §102(b) rejection of Claims 1-4, 6-12, 14-20 and 23 and allow issuance thereof.

V. Conclusion

In view of the foregoing amendment and remarks, the Applicant now sees all of the Claims currently pending in this application to be in condition for allowance and therefore earnestly solicits a Notice of Allowance for all pending claims.

The Applicant requests the Examiner to telephone the undersigned attorney of record at (972) 480-8800 if such would further or expedite the prosecution of the present application.

Respectfully submitted,
HITT GAINES, P.C.



David H. Hitt
Registration No. 33,182

Dated: December 6, 2004

P.O. Box 832570
Richardson, Texas 75083
(972) 480-8800